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Sas: Appropriate Technology for the Development of the 'Third World'

Appropriate Technology for the Development of the 'Third World'

Leora Sas

When one thinks about technology they typically associate the word with terms such as: advancement; progression; civilization; and modernity. In the last century, but more specifically the last fifty years, advancement in the fields of science and technology have led to drastic changes in the way that we live our lives. We are now living in a world that is interconnected and interdependent due to the effects of mass telecommunications and globalization. It is therefore extremely important, not only to examine the ways in which technology has influenced our lives, but to explore the ways in which technology has affected individuals living in different regions of the world. Many questions arise when one thinks about the costs and benefits of attempting to bring 'technological advancements' to individuals in the developing world. Will the technology actually benefit the individuals who will be receiving it? Will people have the 'knowledge' and resources to sustain it? Will everyone benefit equally from the technology? Is it possible to introduce various forms of technology without ignoring local or cultural beliefs? Can the same technology be provided and applied to all societies, everywhere, in the exact same way?

In this essay I will critically examine the ways in which technology can be appropriately introduced to various communities in the 'third world' through the work of development projects. The particular case study that I will be referring to involves the indigenous community of Michacala, in the Parish of Zumbahua, which is located in the province of Cotopaxi, Ecuador. This community was the target of an NGO, *Projecto de Fomento Ganadero* (PROFOGAN) development project, involving the anti-parasitic inoculation of several thousand of the Michacalan villagers' sheep. This case will exemplify what can happen when technology is inappropriately brought to indigenous communities. Despite the fact that the NGO "seems to have taken more than the usual share of conscientious precautions"(Hess 1997:3), I will demonstrate the project ultimately failed due to the developers' lack of understanding of the local knowledge and cultural beliefs of the Michacalan people.

Theories of Development:

In order to understand the strategy employed by the development practitioners working on the PROFOGAN development project, a brief overview of development theories and their history is required. "Today there is no single theoretical model which is commonly used to explain development, nor is there any one solution to the problems of underdevelopment" (Gardner and Lewis 1996:12).

The two paradigms that have structured development until the last decade are modernization theory and dependency theory. Modernization theory visualizes development as different stages on a linear path that ultimately leads to an industrialized and urban society. Gardner and Lewis state that, "it is an inherently optimistic concept because it assumes that all countries will eventually experience economic growth" (1996: 12). Modernization theory implies the classic transfer of technology from the developed countries to the 'third world' and dismisses the importance of local knowledge. In fact, modernization theory views indigenous knowledge as part of the problem because it is considered non-scientific, traditional, irrational and primitive (Sillitoe 2002:3). When this approach is employed, it has direct implications on the way in which practitioners interact with indigenous peoples. It is patronizing and dismissive. In John Pomeroy's work on agricultural co-operatives in Belize, he states that as a result of modernization theory, and the 'top-down' approach, "farmers have been inundated with technology and a world view, both of which have significant social consequences for themselves and for their families" (Pomeroy 1995:92).

Dependency theory argues that development produces inequality, as the rich nations who set up the development projects get

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richer from their efforts, and the rest inevitably get poorer. Dependency is defined as a continuing situation in which the economies of one group of countries are conditioned by the development and expansion of others (qtd in Gardner and Lewis 1996 :17). By elucidating the negative impact of such approaches, the theory promotes a plan whereby radical structural changes are encouraged in third world countries, in order to avoid ongoing underdevelopment. Unfortunately, many development projects have been accused of furthering dependency in third world countries by not attacking the root causes of their impoverishment. Rather than being undeveloped, dependency theorists see countries in the South as underdeveloped by the process of imperial and post-imperial exploitation by the North (Gardner and Lewis 1996: 16). For example, farmers involved in development projects motivated by dependency theory, are seen as helpless victims. Attempting to empower indigenous populations by introducing structural changes in their underlying systems is strongly advocated as a better method of ensuring sustainable development.

Both of the above 'top-down' development perspectives have been criticized as lacking. "Modernization improvement policies, which wrongly assume trickle down from profit-making elites to the rest, often do little to help the poorest and most vulnerable people" (Gardner and Lewis 1996:19) Meanwhile, the radical structural change suggested by dependency theory is not practical in many instances. What other approaches have been suggested instead?

Two 'bottom-up' approaches have come forward. The Neo-Populist and Market-Liberal approaches are a direct challenge to the 'top down' theories by giving more credence to local perspectives. There is a participatory focus in both these 'bottom-up' approaches, which pays a little more attention to local knowledge and includes indigenous people in the identification of their problems. However, even these approaches have their faults. Many believe that although the language used by development practitioners has changed in the last two decades, their 'top-down' views and development practices have not. Although development practitioners often use words such as participatory and empowerment when discussing their planned projects for indigenous communities, they often fail to incorporate indigenous knowledge in to all stages of their projects. Therefore, these projects have the same negative results as those of the past that employed modernization and dependency theory ideals (Chambers and Richards 1995: preface).

Most recently, the Action Approach to development has been put forth as a remedy (Sillitoe 2002: 5). This method allows indigenous peoples to speak for themselves, allowing them to express their own understanding of the world to development practitioners. This approach involves the indigenous people in all stages of the development project, including determining the nature of the research and programs that should be carried out. There is also an attempt by practitioners to communicate the essence of the technology that will be delivered to the people, in a way that they can understand. The Action Approach is truly more participatory and is not so value laden, with less of a distinction between indigenous knowledge and scientific knowledge and technology (Sillitoe 2002:5).

In 1987, CIKARD (Centre for Indigenous Knowledge for Agricultural and Rural Development) was established at Iowa State University. This centre conducts interdisciplinary research, training and extension activities that assist domestic and international development agencies as well as practitioners to, "reduce poverty, enhance equity, reduce environmental degradation, help rural areas work toward self-sufficiency and self-reliance and provide mechanisms to improve local participation to the development process" (Warren and Mckiernan 1997:426). One of the main goals of the CIKARD is to document and preserve the indigenous knowledge of farmers and other rural people around the world and make this information available to development practitioners as well as to scientists. CIKARD has established both regional and national indigenous knowledge resource centres around the globe (Warren and Mckiernan 1997:426). Information obtained from these institutions can be used to assist the development agencies in understanding the local knowledge systems of the individuals they are attempting to help.

I believe that the PROFOGAN development team attempted to use the Action Approach in the implementation of their project, but failed to use this approach in the early planning stages. Members of the NGO went in to the village and conducted their own scientific studies to determine the most productive way to improve the livelihood of the Michacalan people. These studies concluded that strengthening the animal sector in Michacala, would provide the

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most success as it would help conserve the *paramos* (natural grasslands) and augment the *paramos'* productive potential. They created an anti-parasitic campaign that they believed would improve the health of the peoples' sheep and would therefore result in an improvement in the lives of the Michacalan people. The Michacalan people did not become involved in the project until it was ready to be implemented. At this point the NGO sought and gained the support of provincial and regional indigenous peasant organizations who provided translators to help the developers explain the campaign to the Michacalans in their own language *Quichua* (Hess 1997:3). Despite their efforts to provide the Michacalans with information on the project, they made no attempt to understand the cultural beliefs of the Michacalan people. They created their project based solely on their own scientific assessments of what could make the community more profitable.

Therefore, I feel that PROFOGAN relied more heavily on theories of modernization than they did on the participatory model suggested by the Action Approach. The anti-parasitic campaign simply did not 'fit' with the cultural beliefs surrounding treatments for health and illness held by the Michacalan people. The developers showed a lack of respect for, and understanding of, the indigenous knowledge of the Michacalans. Unfortunately the failure of this project is not unlike that of many others caused by a "lack of cross-cultural understanding" (Hess 1997:4).

Scientific Knowledge versus Indigenous Knowledge:

As discussed above, various theories of development have attempted to address the acrimonious relationship between scientific knowledge and indigenous knowledge. According to Sillitoe, "indigenous knowledge is community-based, embedded in and conditioned by local tradition. It is a culturally informed understanding inculcated into individuals from birth onwards, structuring how they interface in their environment" (2002: 9). Indigenous knowledge is local knowledge, knowledge that is unique to a given culture or society (Agrawal 1995: 416). It is however important to recognize that within any given culture or society, there exists internal differentiation in terms of individuals' knowledge, values and beliefs. Scientific knowledge on the other hand, is believed to be global, centralized and technically oriented. This knowledge is guided by empirical measurements and abstract principles that help order the measured observations and facilitate the testing of hypotheses (Agrawal 1995:421).

Over the years, there has been a tendency to view these two types of knowledge systems as diametrically opposed. Typically within development literature, indigenous knowledge has been contrasted with scientific knowledge. It has been seen as subordinate as opposed to dominant, oral versus literate, intuitive versus analytical and subjective versus objective. However, Sillitoe states that anthropologists have to learn to be sceptical of such cut-and-dried negative discriminations. He suggests that knowledge is a continuum. On the one end of the spectrum is the poor rural farmer's knowledge (indigenous knowledge), and at the other end is the Western scientist's knowledge (scientifically based). In between these two polar extremes are many intergradations (2002:110-111).

The issues raised by these definitions of knowledge are particularly relevant to the practice of introducing technology into the 'third world'. Kim Vincente, author of *The Human Factor*, discusses the differentiation between humanistic and mechanistic views of the world. He suggests that traditional disciplinary boundaries create a division between the human and technical sciences, and neither one sees the relationship between people and technology (2003: 32). He suggests a balance.

Case Study: Sheep Inoculation Campaign in Michacala

The primary goal of the NGO project was to demonstrate the efficiency of an anti-parasitic cure as a means of conserving the *paramos* and augmenting the *paramos* productive potential to that indigenous population (Hess 1997:1-6). Following an environmental assessment of the climatic and economic conditions in Michacala, it was determined that the best way to preserve the *paramo* ecology was by promoting the pastoral economy not by expanding the agricultural program. In other words, PROFOGAN's principal aim was to strengthen the animal sector in Michacala, specifically sheep breeding.

From an economic perspective, it was important that animal husbandry become more attractive to the indigenous community by becoming more lucrative. The development practitioners involved in this project determined that the *paramo* dwellers practiced a very deficient animal husbandry, and as a result had a

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very low economic return for their efforts. In order to improve their quality of life, the people needed to change their practice of sheep management and be more efficient.

A scientific approach to sheep breeding was employed as a model for examining the management practices of the Michacalan farmers. The practitioners consulted zoo-technicians and veterinarians regarding an ideal model of practice for sheep breeding. The Michacalan practice of sheep breeding was then compared with this university-based model. The manner in which genetic selection, provision of shelter and nutrition, methods of castration, tupping and docking, and maintenance of sheep health (treatment for eye infections, parasites, intestinal disorders) carried out by the farmers was formally assessed. A questionnaire was distributed and farmers were observed while working in order to collect this information. Based on an analysis of the farmers' responses, and their practices, the developers chose an inoculation program designed to reduce the number of sheep dying of parasites, as the best way in which to intervene in this community (Hess 1997: 51-67).

Despite the good intentions of the project and the numerous precautions taken by the practitioners to understand how the sheep were cared for, it failed miserably. The project did not have the desired effect of demonstrating the efficiency of an anti-parasitic cure to the indigenous people, and as a result it did not lead to an improvement in the economy and livelihood of the people. The people did not adopt the program.

In the book *Hungry for Hope*, Carmen Hess discusses the reasons why this project failed. She does this through an in-depth analysis of the indigenous views of sheep health and human illness, and the treatments used by the people when illness occurs in the community. She demonstrates how there was a "lack of fit" between the technology offered (ie. inoculation) and the cultural belief systems of the Michacalan people towards illness. In his MA thesis, John Pomeroy witnessed this 'lack of fit' between cultural beliefs and technology when studying farming cooperatives in Belize. As a remedy he suggests that project planners need to, "adopt a flexible learning approach which responds to local needs" (Pomeroy 1995:20). This, he says, "can only be achieved through active participation by members" (Pomeroy 1995:20).

Although the PROFOGAN practitioners surveyed the farmers on how they cared for their animals day to day, they did not take into account the underlying beliefs of the people in regards to the etiology of illness and the preferred treatment.

In particular, Hess describes the Latin American theory of a thermal equilibrium of humours known to anthropologists as the 'hot-cold syndrome', wherein illness symptoms are thought to be caused by a thermal imbalance. This theory applies to both humans and animals (Hess 1997: 2). She learned that Michacalan theories of illness include four concepts: bad luck; sinister person; witchcraft; and the evil influence of rainbow (Hess 1997: 67-79). She concludes that this elaborate belief system was at odds with the practice of inoculation and therefore the project was doomed before it ever began.

In order to truly comprehend the lack of fit between the developers' inoculation campaign and the cultural beliefs of the Michacalan people, the Michacalans' theories on illness must be explained in more detail. The 'hot-cold syndrome' mentioned above is believed to be one of the main causes of sickness and death amongst people and animals in Michacala. Hot and cold imbalances do not necessarily correspond to tangible bodily temperatures. Hess states that, "fever may be taken for a symptom of a hot imbalance but so can be skin disease or headache. On the other hand, shivering can be indicative of a cold imbalance, but so is coughing, cramp and wind" (1997:2). From these examples we can conclude that 'hot' and 'cold' are mainly metaphoric terms.

According to Michacalan indigenous knowledge, all foods as well as every inedible plant or herb has a place on the "cold-to-cool-to-temperate-to-hot scale". For example, some foods considered to have warming qualities are: avocado; fried fish; beef; and pepper sauce. Some examples of foods that have cooling qualities are: rice; soup with small noodles; potatoes; and raw eggs. The Michacalans believe that certain foods and inedible herbs can cause hot-cold imbalances, as well as be used to treat these imbalances. Hess described how puzzled she was when one of the Michacalan women told her that she treated her sheep, who had a swollen belly (a perceived cold imbalance), by rubbing hot pepper sauce around its anus. This made perfect sense to the woman because hot pepper sauce, as mentioned earlier, is associated with warming effects, but to Hess this practise seemed absurd (1997:2).

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Another local belief is that vaccines can be used to cool down the thermal conditions of animals. They are therefore given to animals that are believed to be suffering from hot imbalances. This belief makes obvious the reason why PROFOGAN's inoculation campaign failed! After giving the anti-parasitic vaccine to thousands of the villagers' sheep, many of the sheep died (of whatever cause). The people automatically blamed the deaths on the vaccination. The reason for this was that the Michacalans believe that, "vaccines cool down the thermal condition of animals whether they are thermally balanced, that is, healthy, or already imbalanced toward the cold or hot side" (Hess 1997:3). Therefore the villagers felt that the injections either induced or aggravated a cold imbalance in the sheep.

In looking at the four different theories that the Michacalans have regarding illness, it becomes even more evident why the inoculation campaign was hopeless from the start. Hess states:

> the principle limit of our questionnaire [PROFOGAN's] concerning sheep management and healthcare in Michacala was that it was set up according to scientific descriptive illness categories. This made us blind to the underlying etiological conceptions held by the Michacalan people themselves (1997:67).

When a sheep has diarrhoea, or is skinny, sterile, or has had an accidental fall, it is said to have been affected by 'bad luck' or *chiqui.* This illness is believed to be indirectly caused by the sheep owner or his relatives. The Michacalans believe that sheep get sick and die as a consequence of the owners' bad luck. Those who lead socially offensive lives are the ones who contract bad luck and then pass it on to their animals. Hess provides the following example of bad luck as told to her by one of her informants, " If one is unhappy and fights a lot, this is very bad. Such a person becomes ill-fated. Adulterers, those who fight with their neighbours, their spouses, or family-those are very, very *chiqui*" (1997:70). In order to treat an animal who is suffering from bad luck, the owner uses a strong-smelling plant to literally beat the illness out of the animal (Hess 1997:70).

Sinister person or *lazipa* is very similar to the concept of bad luck, and is caused by the same socially unacceptable behaviour. It differs in only one respect and that is that people inflicted with sinister person do not endanger their own animals but only those of other people. Hess states that this illness, "most often harms small, young, or especially pretty animals" (1997:71). When an animal such as a guinea pig is infected by this illness the typical treatment involves forcing the animal to walk on a bed of stinging nettles. It is believed that these nettles irritate the *lazipa* so much that it leaves the animal's body.

The evil influence of rainbow or *cuichi* is also considered one of the main causes of illness in Michacala. According to Michacalan belief, the areas where a rainbow touches the ground somehow become contaminated. Any animals that forage in the infected areas will fall ill. Also, any water that looks murky is considered to have been infected by rainbow, and any animal that drinks form this water will contract the illness. Symptoms of this illness include: hoof rot; weight loss; worms; and swollen bellies. It is believed that affliction by rainbow is caused by a spirit getting hold of the animal. In order to expel the illness-causing spirit, the animal must be beaten. Similar to the treatment for bad luck, animals with rainbow are beaten with strong smelling plants. In order to combat the evil forces of rainbow, villagers often encircle their land with the skulls of various 'powerful animals' such as donkeys and horses. They believe that this will protect weaker animals such as the sheep (Hess 1997: 67-69).

Michacalans believe that witchcraft or *pucuna* is to blame for the most virulent diseases that inflict their animals or themselves. Witchcraft is usually carried out by someone wishing to cause harm towards an enemies' animals. The person does this by, "collect[ing] some of the droppings or samples of wool of the target herd, which he then brings to a sorcerer. The sorcerer will blow over the items with cinnamon, cigarette smoke, and eau-de-Cologne, putting a spell on the whole flock in this way" (Hess 1997:72). Whenever an animal is diagnosed with witchcraft the villagers do not attempt to cure them themselves. Rather, they bring their sick animals to a specialist, usually another sorcerer or a healer. This sorcerer's job is to find out who sent the magic spell and then to send it back to where it came from.

After examining the various Michacalan theories of illness, it is clear why the PROFOGAN project failed. The Michacalans do not view health and illness in the same way as the development practitioners who tried to implement the inoculation campaign. Although

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the villagers did agree to the campaign out of desperation due to their dire economic situation, in the end they did not adopt the program. I argue that PROFOGAN would have been much more successful in helping improve the lives of the Michacalans had they taken the time to incorporate the local people and their knowledge in to all stages of the development process. PROFOGAN simply did not understand the underlying cultural beliefs of the Michacalan people. Eduardo Baez, former director of the Nicaragua adult education program, provides the analogy of 'changing the house' in regards to the aforementioned problem. He explained this analogy to Deborah Barndt as follows:

> Take this house, for example, Eduardo said, looking around my kitchen. You may think that you know this house, that you understand it. But what if you want to change this house? You could paint the walls in different colours, move the curtains, change the doors. But you wouldn't change the house; maybe it would look different, but it would still be the same house. If you want to change the house, Eduardo continued, you have to understand its *structure,* how this house is built, what holds it together. Eduardo leaned over and tapped a structural column running from floor to ceiling. You have to understand that if [a] piece of wood is taken away, the whole house is going to cave in (Singh and Titi 1995:92-93).

This deeper understanding of the structure of a society that Baez alludes to in his 'changing the house' analogy, is exactly what the PROFOGAN project failed to accomplish. The development practitioners went in to the Michacalana' 'house' and tried to make changes without understanding its unique structure. Had the development practitioners taken the time to listen to, and learn from, the Michacalans, they most likely would have created a completely different project.

This PROFOGAN inoculation campaign exemplifies the problems that can occur when technology is inappropriately introduced to the developing world. It also demonstrates how important it is for development agencies and practitioners to understand and respect the local knowledge systems of the individuals they are trying to assist.

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